

**Challenge: Skills and Applications**

For use with pages 9–14

**Evaluate each expression for the given values of the variables.**

1.  $a^n$  when  $a = 4$  and  $n = 3$
2.  $(a - 5)^n$  when  $a = 7$  and  $n = 5$
3.  $(9 - a)^n$  when  $a = 6$  and  $n = 4$

**Find the value of  $n$  in each.**

4.  $2^n = 16$
5.  $3^n = 9$
6.  $10^n = 10,000,000$
7.  $5^n = 625$
8. If  $3^{-2} = \frac{1}{9}$ , what do you think  $4^{-2}$  equals?
9. If  $\left(\frac{1}{2}\right)^{-3} = 8$ , what do you think  $\left(\frac{1}{2}\right)^{-4}$  equals?

**For Exercises 10–12, use the following figures.**

Figure 1

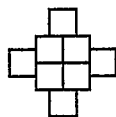


Figure 2

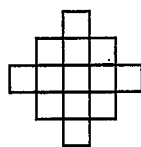


Figure 3

10. Copy the first three figures on graph paper. Then draw the fourth and the fifth figures of the sequence.
11. Look for a pattern in the areas of the figures and complete the table.

Figure	1	2	3	4	5
Area	5	8	13		
Pattern					

12. Write an expression using an exponent for the area of the  $n$ th figure.